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Final Sampling And Analysis Plan for the Pre-Remedial Investigation of the Mound Site Plume

February 6, 1997

Revision 0

FINAL

Sampling And Analysis Plan for the Pre-Remedial Investigation of the Mound Site Plume

February 6, 1997

Revision 0

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FIGURES

TABLES

1 0 INTRODUCTION

The purpose of this Sampling and Analysis Plan (SAP) is to collect field data to identify and delineate the extent of the collection and treatment system necessary to capture the volatile organic compound (VOC) groundwater contamination derived from the Mound Site, Individual Hazardous Substance Site (IHSS) 113 While groundwater remediation is not a requirement of the Rocky Flats Cleanup Agreement (RFCA) (DOE 1996a), collection and treatment of this contaminated groundwater plume is consistent with the strategy for groundwater which is to prevent contamination of surface water by applying action levels to groundwater which are protective of surface water

The objective of the SAP is to describe the specific data needs, sampling and analysis requirements, data handling procedures, and associated Quality Assurance/Quality Control (QA/QC) requirements for this project All work will be performed in accordance with the RMRS Quality Assurance Program Description (QAPD) (RMRS 1997) The SAP summarizes the existing data, and describes the scope of work required to define the nature and extent of contamination in groundwater down gradient of the Mound Site at the Rocky Flats Environmental Technology Site (RFETS) sufficiently to design a collection and treatment system

1 1 Background

The Mound Site Groundwater Plume is located north of Central Avenue, and east of the protected area fence This plume of primarily VOC contaminated groundwater is believed to extend northward from the Mound Site, and discharges as seeps and subsurface flow into the South Walnut Creek Drainage in the vicinity of seep SW059 (Figure 1) VOC contaminated groundwater is found in monitoring wells between the Mound Site and South Walnut Creek, which indicates that the Mound Site is the primary source area for the plume

The Mound Site is the location where approximately 1,405 intact drums were stored on the ground and covered with soil between April 1954 and September 1958 The drums contained uranium and beryllium-contaminated lathe coolant (a mixture of approximately 70 percent hydraulic oil and 30 percent carbon tetrachloride) that originated from Building 883, Building 771, and Building 776 Historical information also indicates that some of the coolant contained low levels of plutonium In

Insert Figure 1

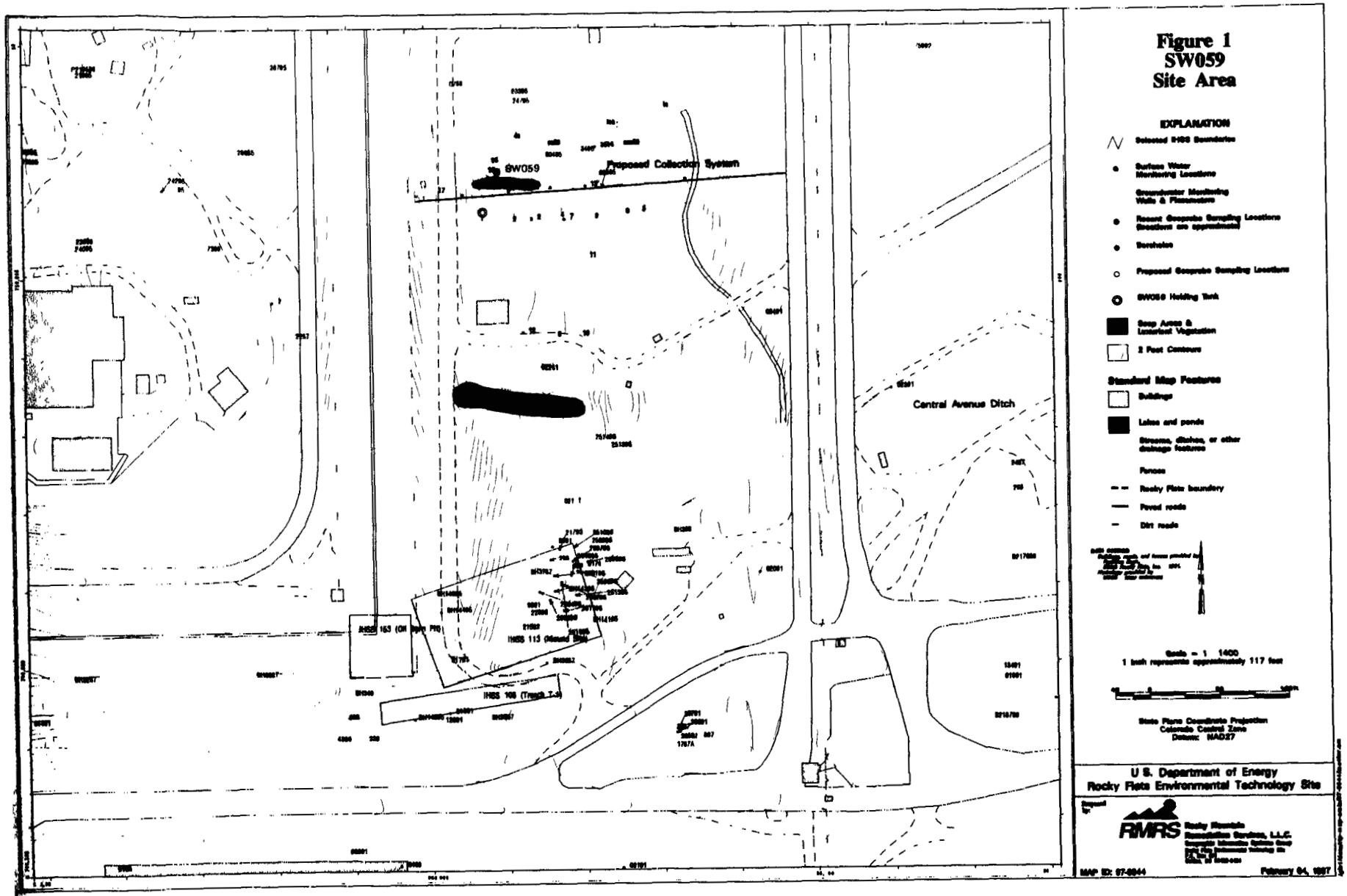


Figure 1
SW059
Site Area

EXPLANATION

Standard Map Features

Buildings

Lakes and ponds

Fences

Rocky Flats boundary

Paved roads

Dirt roads

Scale = 1 : 1600

1 inch represents approximately 117 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

RMRS

MAP ID: 97-0844

February 04, 1997

addition, some of the drums contained tetrachloroethene, which has been found at high concentrations in monitoring wells and soil borings at the Mound Site (DOE 1992)

In 1970, all drums were removed from the Mound Site along with some radiologically contaminated soil Approximately 10 percent of the drums were thought to be leaking at the time of removal However, there are no records of the volume of contaminants released to the soils at the Mound Site Solid material was shipped offsite for disposal, while liquids were sent to Building 774 for processing No airborne radiological contamination was detected during the drum removal Soil from the excavation was graded, and the excess was placed in the landfill Additional radioactive soils were identified and removed at later dates (DOE 1992)

The Mound Site Area has been extensively disturbed since the initial source removal The western portion was removed during construction of the protected area (PA) fence The southern area was disturbed by excavation of the Central Avenue ditch, and there have been other construction activities in the area (DOE 1995) The unlined Central Avenue Ditch may be a significant source of groundwater recharge for the Mound Site Plume

Recent investigations have detected VOCs, predominantly tetrachloroethene in subsurface soils at levels requiring cleanup It is estimated that 400 to 1,000 cubic yards (yd^3) of soil are contaminated with VOCs (RMRS 1996a, DOE 1996b) above the Tier I Subsurface Soil Action Levels specified in the RFCA (DOE 1996a)

An accelerated removal action will be completed this year to excavate the contaminated soils above Tier I action levels from the Mound Site (DOE 1996b) Low temperature thermal desorption technology will be used to remove the VOC contaminants of concern the treated soil will be returned to the Mound Site excavation and the area will be revegetated During this action a permanent culvert will be installed in the Central Avenue Ditch which will effectively eliminate a major source of water for the Mound Site Plume (DOE 1996b)

1 2 Prior Investigations

The Mound Site area was extensively investigated as part of the Operable Unit 2 (OU 2) Phase II RFI/RI investigation Volatile organic compounds (VOCs) were identified in both subsurface soil, and in the groundwater contaminant plume north of the Mound Site which apparently extends towards South Walnut Creek (DOE 1995) A soil gas study in 1994 identified an area with elevated volatile organic concentrations at the northeast corner of the Mound Site (EG&G 1994) During the 1995 Trenches and Mound Site investigation (RMRS 1996b), additional subsurface soil samples were collected in the contaminated area defined by the soil gas survey The 1996 Pre-Remedial Investigation of the Mound Site (RMRS 1996a) further delineated this area of VOC contamination.

An investigation of the distal edge of the plume was conducted in late 1996 by EPA from the Ada Oklahoma Office to refine the plume extent by collecting groundwater samples. The location of these geoprobe holes is shown of Figure 1 Groundwater was found sporadically and many of the geoprobe holes on the eastern side of the area were dry VOC contaminated groundwater was found in several geoprobe holes, especially in the central portion of the area. The highest VOC concentrations were found at location 12 with 4,200 ug/l of tetrachloroethene and 3,800 ug/l of trichloroethene Groundwater containing low levels of VOCs (19 ug/l of tetrachloroethene and 14 ug/l of trichloroethene) was also found on the west side of the eastern road around the protected area (EPA 1996) This may indicate the presence of a separate source area west of seep SW059, or may indicate recharge from fill in this area which may contain low levels of VOC contamination

1 3 Site Conceptual Model

The Mound Site is located on level ground along the northern edge of the South Walnut Creek Drainage The ground surface slopes steeply to the north away from the Mound Site towards the incised drainage of South Walnut Creek The surficial deposits consist of approximately 12 feet of Rocky Flats Alluvium, colluvium and slump deposits along with artificial fill, and disturbed soil Bedrock unconformably underlies the surficial deposits and consists of weathered claystone and minor sandstones of the Cretaceous Arapahoe and Laramie Formations (DOE 1995, DOE 1996b)

The Rocky Flats Alluvium consists of beds and lenses of poorly to moderately sorted clayey and silty gravels and sands interbedded with clay and silty lenses The unconsolidated colluvium on the hill

slope is primarily composed of clay, or silty and/or sandy clay Caliche is common in both alluvium and colluvium There are numerous slump features present on the hill slope (DOE 1996b)

The Arapahoe No 1 Sandstone subcrops under the alluvium at the northwest corner of the Mound Site This sandstone is truncated to the north by the South Walnut Creek drainage and subcrops beneath the colluvium between the Mound Site and South Walnut Creek (DOE 1995 RMRS 1996c) The subcrop area corresponds to an area of intermittent seeps (Figure 1) Other bedrock sandstones are present but have very high clay contents and are not significant sources of groundwater Near the distal end of the plume, approximately 10 to 16 feet of clay-rich colluvium partially derived from the Rocky Flats Alluvium unconformably overlies Laramie Formation claystone (DOE 1995, EG&G 1995a, EG&G 1995b RMRS 1996a, and RMRS 1996c)

Depth to groundwater is approximately 12 feet at the Mound Site (within the weathered bedrock) Unconsolidated materials are dry for much of the year but groundwater can fluctuate up to approximately 6 feet below ground surface Groundwater levels at the distal end of the plume near South Walnut Creek are typically 3 to 8 feet below ground surface Mean hydraulic conductivities in this area are 6×10^{-04} cm/sec for the Rocky Flats Alluvium and 8×10^{-08} cm/sec for the weathered claystone (DOE 1995) Geometric mean hydraulic conductivity for the colluvium is 9×10^{-05} cm/sec (EG&G 1995b)

Recent investigations indicate that the Mound Site Plume consists of contaminated groundwater in the alluvium, colluvium and the underlying Number One Sandstone which are part of the upper hydrostratigraphic unit (UHSU) Groundwater flow in the alluvium and colluvium occurs through saturated alluvium in bedrock lows and paleoscours in the top of the bedrock Groundwater appears to flow primarily along the bedrock surface and is probably controlled by small channels incised into the bedrock surface or by slump structures Based on data from boreholes in this area, it appears that the bedrock surface forms a narrow trough plunging to the north The bedrock rises to the east and west from the center of this trough and bedrock highs appear to bound the east and west sides of the plume area and limit the plume extent In addition, photographs show that during wet periods two lines of seeps are developed between the Mound Site and SW059 (Figure 1) These seeps do not traverse the entire area, but are instead limited to the western side of the area The upper seep line

may be related to the subcropping Number One Sandstone, the lower seep may be related to bedrock sandstones, slump glide planes or to the subcropping saturated area (DOE 1995, RMRS 1996c).

The groundwater flow direction in the Rocky Flats Alluvium near the Mound Site is primarily to the north with a gradient of 0 011 ft/ft. Groundwater flows to the north through the No 1 Sandstone until it subcrops beneath the colluvium, indicated by a line of seeps along the slope towards South Walnut Creek Infiltration of precipitation or UHSU groundwater into the underlying unweathered claystone is limited (DOE 1995, EG&G 1995b) Figure 2 depicts the generalized hydrogeologic cross section at the Mound Site

The expected groundwater flow for the Mound Site Plume was calculated at between 7 8 and 31 2 ft^3/day (58 35 to 233 39 gallons/day) based on mean saturated thickness of 5 feet, mean hydraulic conductivity (K) of 26 ft/day, hydraulic gradient of 0 12 ft/ft, porosity of 0 3, transmissivity of 1 3 ft^2/day, and a plume width of 50 to 200 feet.

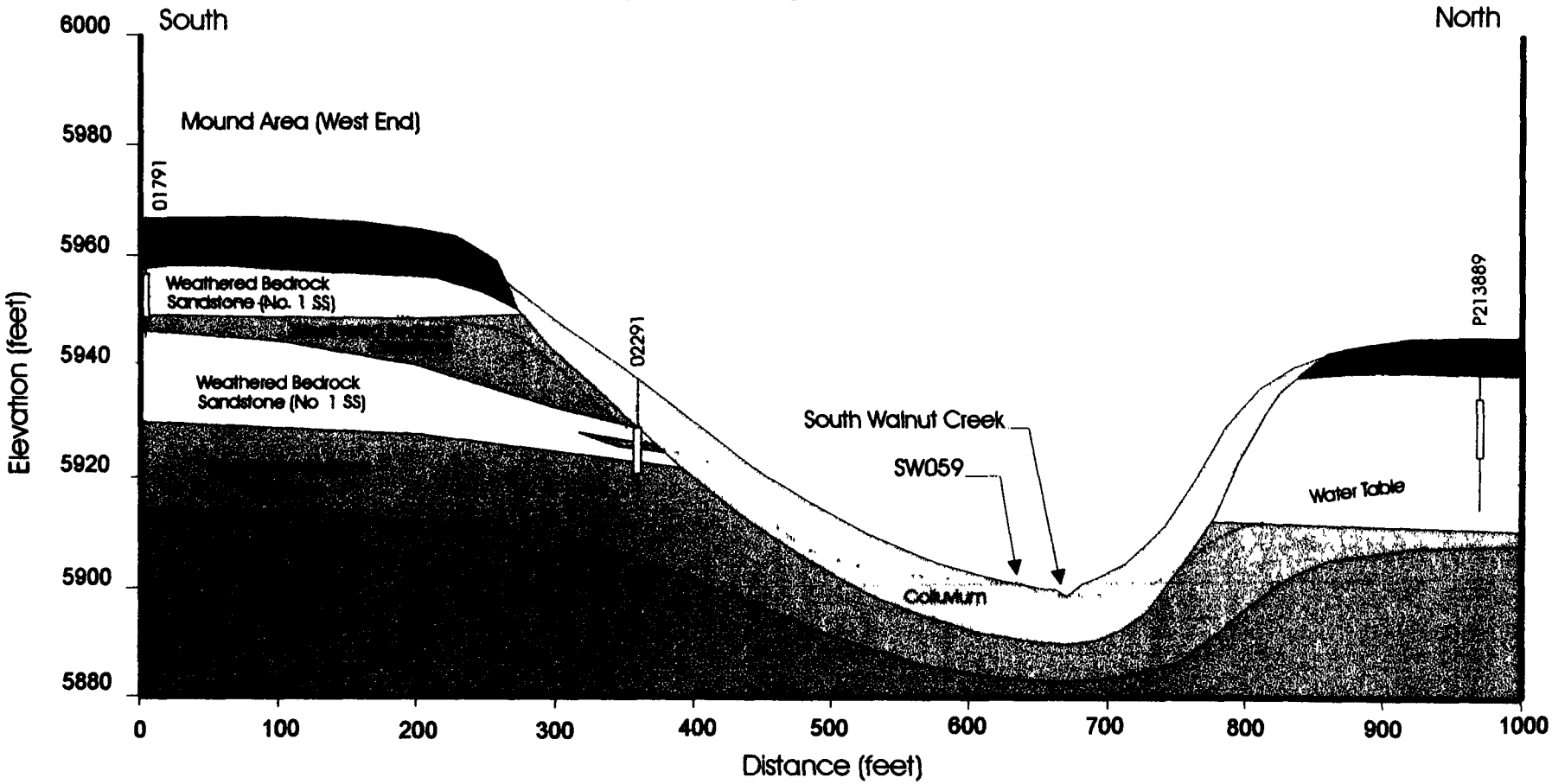
Recharge occurs primarily through local infiltration of precipitation. The Central Avenue Ditch runs along the southern boundary of the Mound Site and probably also recharges the UHSU groundwater in this area. Discharge from the UHSU is mostly through seeps located where the water bearing units are truncated by the South Walnut Creek, and through evapotranspiration Depending on the season, unsaturated areas may occur within the plume (DOE 1996b, EG&G 1995b, RMRS 1996c)

The groundwater contaminant plume is poorly defined, but it is suspected to extend northward from the former location of the Mound Site (Figure 1) to the south bank of South Walnut Creek. The groundwater contaminant plume is discharging through surface and subsurface seeps along the hillside, and along seeps on the south bank of South Walnut Creek At seep SW059, groundwater containing low levels of VOCs with trace amounts of radionuclides discharges at a rate of 0 5 gallons per minute, or less The seep water is collected, stored in a tank near the seep, then transported and treated at the Building 891 Combined Water Treatment Facility (DOE 1995, RMRS 1996b)

Figure 2

Mound Groundwater Plume

Hydrogeologic Cross Section



1 *Insert figure 2*

Based on available data

1 The Mound Site VOC plume is believed to be derived from the Mound Site.
2 Groundwater flow is towards South Walnut Creek along the bedrock surface and is locally controlled by depressions and channels in the bedrock surface, Groundwater flow is primarily along the west side of the area, and
3 It is expected that the eastern side of the potential plume area will be dry

1 4 Mound Site Plume Contamination Data Summary

Dense nonaqueous phase liquid (DNAPL) contaminated subsurface soils at the Mound Site area are suspected to be the source of the groundwater contamination Trench T-1 could possibly contribute to this plume however, there is no evidence of a contaminated groundwater plume extending northward from Trench T-1 Therefore, the Mound Site is the likely source of the contaminated groundwater plume There is an east-west trending bedrock high located between the 903 Pad and Mound Site, near the south side of the Mound Site Therefore VOC contaminated alluvial groundwater from the 903 Pad generally flows eastward and south of the Mound Site, along the south side of this bedrock high Wells in both the No 1 Sandstone and alluvium upgradient of the Mound Site contain 0 to 2 micrograms per liter (ug/l) total VOCs (DOE 1995, DOE 1996b, RMRS 1996b)

While thirty-five VOCs have been detected in the Mound Site Plume groundwater, tetrachloroethene and trichloroethene are the dominant contaminants Tetrachloroethene is the predominant contaminant with the highest historic concentration of 528 000 ug/l found at well 0174 at the Mound Site The maximum concentration of trichloroethene was detected with the maximum tetrachloroethene value Concentrations of these chemicals decrease towards South Walnut Creek Groundwater collected during the recent EPA investigation confirmed that VOC contaminated groundwater was present in localized areas near the South Walnut Creek Drainage Vinyl chloride has been detected in concentration up to 860 ug/l in well 3586 along the South Walnut Creek drainage The well is located over 500 feet from the source area, which indicates that this may be a degradation product, not a primary constituent (RMRS 1996c, DOE 1995 DOE 1996b)

The maximum groundwater concentrations of tetrachloroethene and trichloroethene near the source area are provided in Table 1 Groundwater action levels were established in RFCA (1996a) and are described in Section 2 0 Data Quality Objectives Table 2 provides the analytical data for the constituents in Seep SW059 which are above the RFCA Tier II action levels during 1995 No constituents above Tier I action levels were detected at SW059 from 1995 to the present.

Table 1 Maximum Mound Site Downgradient Groundwater Sampling Results Summary (adapted from DOE 1996b)

Contaminant	Well 0174	Well 02191	Well 02291	Well 1987	Well 2087
Tetrachloroethene	528 000 ug/l	980 ug/l	3,400 ug/l	2 300 ug/l	370 ug/l
Trichloroethene	18,000 ug/l	67 ug/l	410 ug/l	110 ug/l	5 ug/l

Note all values are maximum observed concentrations regardless of date collected

Table 2 SW059 Constituents Greater than Tier II Action Levels in 1995

Group	Chemical Name	Unit of Measure	Minimum Value	Maximum Value	Average Detect Value	Detects	Tier II Action Level Value
Dis Metals	Antimony	ug/l	11 89	16 00	13 56	8	6
Dis Metals	Manganese	ug/l	2 20	339 15	269 78	17	183
Dis Metals	Thallium	ug/l	4 60	4 60	4 60	1	2
Tot Metals	Antimony	ug/l	11 30	11 30	11 30	1	6
Tot Metals	Manganese	ug/l	258	1 440	387	15	183
Tot Rads	Americium-241	pCi/l	0 25	0 25	0 25	1	0 145
Tot. Rads	Cesium-134	pCi/l	0.23	0 57	0.40	2	0 151
Tot Rads	Plutonium-239/240	pCi/l	0 01	0 18	0 05	9	0 151
Tot. Rads	Uranium-233 -234	pCi/l	3 40	3 40	3.40	1	2.98
Tot Rads	Uranium-238	pCi/l	3 02	3 02	3 02	1	0 768
VOA524 2	Carbon Tetrachloride	ug/l	3 00	130.00	33.94	6	5
VOA524 2	Methylene Chloride	ug/l	0 10	18 00	2 74	7	5
VOA524 2	Tetrachloroethene	ug/l	1 00	54 00	11.56	16	5
VOA524.2	Trichloroethene	ug/l	1	76	16	16	5
VOA524 2	Vinyl Chloride	ug/l	0 70	3 00	1 68	4	2

Note: Metal action levels are for dissolved metals only but were applied to total metals for this table

2 0 PROJECT AND DATA QUALITY OBJECTIVES

The objective of this SAP is to characterize the depth, volume and extent of the contaminated groundwater plume sufficiently for planning future remedial actions Data requirements to support

this project were developed using criteria established in *Guidance for the Data Quality Objective Process*, EPA QA/G-4 (EPA 1994) The data gaps, study boundaries, and decisions are described below

Groundwater action levels are specified in RFCA (DOE 1996a) and are intended to prevent contamination of surface water by applying action levels to groundwater which are protective of surface water and ecological resources These groundwater action levels are based on maximum concentration limits (MCLs) and applied using a two-tiered approach Tier I action levels are 100 x MCLs and are designed to identify sources of groundwater contamination that should be addressed through accelerated actions In the case of the Mound Site Plume, an accelerated action for the source is planned this year Tier II action levels consist of MCLs and are designed to prevent surface water from exceeding surface water standards by triggering groundwater management actions when necessary The proposed follow-on action for the Mound Site Plume will be a groundwater management action

This pre-remedial investigation will serve several purposes as described below

- determine the elevation of the bedrock surface within the boundaries of the investigation area,
- define the lateral and vertical extent of the VOC plume above Tier II action level concentrations to support the design of a collection system and
- provide data to properly disposition the soil removed during construction of the collection system

This study focuses on the area south of South Walnut Creek bounded to the west by the dirt road on the east side of the protected area fence, and to the east by the old east perimeter road, now used as the main access to the sewage treatment plant This area contains the seeps that are thought to be related to the Mound Site contaminated groundwater plume (Figure 1)

Previous investigations have indicated that the bedrock surface in the South Walnut Creek drainage is relatively irregular with local channels (DOE 1995 RMRS 1996c) These channels may be drainages developed prior to the deposition of the colluvium or depressions caused by landslide activity In either case these channels influence local groundwater flow direction and in the case of

limited saturation, may be the only areas in which lateral flow occurs Determining the bedrock-alluvial contact may help position and limit the required size of the groundwater collection system. Evaluation of the weathered bedrock core from these geoprobe holes may indicate whether there is potential for significant groundwater flow in the weathered bedrock

Approximately 20 locations will be investigated Seventeen locations are along an east-west line, bounded to the east and west by the roads described above The staggered locations will be offset approximately 10 ' north and 10' south of the proposed collection system (Figure 1) Subsurface samples will be collected using Geoprobe push-type hydraulic equipment. Table 3 lists the projected number of samples to be collected, analyses, and sampling requirements.

Table 3 Analytical Sampling Requirements

Analysis Method	Number of Samples	Number of QC Samples	Total Number Samples	Containers, Preservatives, Holding Times
Groundwater SW846 Method 8260A	20	1 duplicate 1 rinsate 5 trip blanks (1 per shipment)	27	Three 40 ml teflon lined VOA vials with septum lids HCl to pH < 2 and 4° C 14 days
Soils SW846 Method 8260A	4	1 duplicate		250 ml wide mouth teflon lined, glass jar, 4° C 14 days
Target Analyte List (TAL) Metals (6010 and 7000 series methods)	4	1 duplicate		500 ml glass jar NA 61 days
Alpha Spectroscopy for Uranium, Plutonium 239/240 and Americium 241	4	1 duplicate	15	250 ml glass jar NA 6 months

Core samples will be recovered continuously in two to five-foot increments and evaluated by a geologist familiar with the local stratigraphy The geologist will determine the depth to bedrock, and the geoprobe locations will be surveyed using Global Positioning System (GPS) equipment so that data can be properly plotted.

At each location after the core has been collected a temporary slotted PVC liner will be installed in accordance with GT 06 Monitoring Well and Piezometer Installation, and any water within the well will be allowed to equilibrate over night If no water is detected, the well will be observed weekly during the rest of the investigation If water is detected, the depth to water from the land surface will be measured so that thickness and extent of saturated alluvium can be determined

If a sufficient amount of water is detected a groundwater sample will be collected and delivered to the EPA for VOC analysis The EPA will have the responsibility for performing the analyses and providing results These samples will be used to determine to what extent the groundwater within the study area contains VOCs in excess of the Tier II Ground Water Action Levels established by the RFCA (DOE 1996a) This determination will provide input to the sizing requirements for the collection system It is assumed that the EPA will use SW846 Method 8260A (EPA 1992) for the analysis This method will provide a detection limit below the Tier II levels described above, for the predominant VOCs

Soil samples will be collected from the recovered soil cores and analyzed for a variety of contaminants to support the proper disposition of the soil removed during the subsequent trench construction activities These analyses will include VOCs, metals and radionuclides using radiochemical techniques (see Table 3) If signs of significant contamination are present (e g , visible staining) samples will be collected for toxic characteristic leaching procedure analysis Approximately four samples will be collected to support the excavated soil disposition

There are sufficient hydraulic conductivity data available for this area and no additional data will be collected at this time Follow-on remedial actions, such as installation of the collection system are not a part of this SAP and will be performed through either Interim Measure/Interim Remedial Action (IM/IRA) or Proposed Action Memorandum (PAM) documents

3 0 SAMPLING AND ANALYSES

This investigation has been designed to collect the data necessary to site the collection system This investigation will consist of advancing up to 20 geoprobe holes across the width of the plume area to

identify depth to bedrock, collecting four subsurface soil samples for characterizing subsurface soil characteristics, temporarily installing PVC liners in the 20 geoprobe holes, determining water levels and collecting available groundwater for analyses These actions are designed to delineate the extent of contaminated groundwater near South Walnut Creek, and provide data to adequately design the collection and treatment systems.

Seventeen geoprobe holes will be located along the length of the projected collection system Geoprobe holes will be located approximately 30 feet apart, in a staggered line from the eastern edge of the Protected Area fence to the western edge of the road adjacent to the Sewage Treatment Plant Figure 1 shows the approximate location of the geoprobe holes, along with the projected location of the collection system The geoprobe holes will be located alternately 10 feet north and south of this projected collection system to create a better 3-dimensional conceptual model of the hillside and plume area. If locations need to be changed to avoid obstructions, these changes will be noted in the field logbook Three additional geoprobe holes may be located to further investigate an area or areas of interest if conditions warrant

The sampling requirements for each type of sample event to be performed under this SAP are described in Table 3 and in the following sections Samples will be handled in accordance with FO 10 Receiving, Labeling, and Handling Environmental Material Containers, and FO 13 Containerization, Preserving, Handling and Shipping of Soil and Water Samples If conditions are encountered in the field which make the use of a procedure unsafe or inappropriate for the task at hand, the specified procedures may be modified or replaced as long as the modification or replacement procedure is justified and detailed in the field logbook, and the resulting data is comparable and adequate to meet the objectives of the project.

3 1 Field Preparation

Before data collection begins, each geoprobe location will be established using tape and compass, and marked with a reference stakes or flags with the unique number for that location The geoprobe location number will be obtained from RFEDS (or the Water Database) and correlated with sample analyses for that location These locations will be surveyed for location and elevation using GPS receivers operated in accordance with the equipment manuals (Ashtech 1993)

3 2 Geoprobe Samples

All geoprobe boreholes will be advanced to a depth of two feet into weathered bedrock, or to a sufficient depth to confirm unweathered bedrock, a depth expected not to exceed 20 feet If refusal occurs prior to reaching bedrock up to two offsets will be pushed to try and reach the sampling objectives Geoprobe operations will be conducted as per GT 39 Push Subsurface Soil Sample

Core samples will be collected continuously in two to five foot increments from the surface to approximately two feet into bedrock These core samples will be monitored in accordance with FO 15 Photoionization Detectors and Flame Ionization Detectors, visually inspected for signs of DNAPL or other contaminant staining, and then visually logged by the field geologist as per GT 01 Logging Alluvial and Bedrock Material In addition, soil samples will be collected for analyses as described in Table 3 from every fifth geoprobe hole assumed to be the first, sixth, eleventh, and sixteenth geoprobe holes for analyses to characterize the subsurface soils The samples collected for metals and radionuclide analyses will be composited from the 2 foot interval directly above bedrock or where bedrock is not reached from the lowest portion of the core retrieved Samples collected for VOCs will be taken from discrete intervals where there are indications of contaminants, or from the section of the colluvium immediately above the bedrock Samples will be shipped offsite to the EPA for analysis at an EPA-approved laboratory If insufficient material is available for all analyses, VOC samples will be collected first, followed by radionuclides and metals samples

3 3 Groundwater Samples

After the Geoprobe holes are completed to the required depth, two feet of 1/2" to 3/4" internal diameter, Number 10 slotted, Schedule 40 PVC screen will be threaded onto sufficient Schedule 40 PVC casing to reach 6 inches or more above the ground surface The screened section will have a threaded cap on the bottom This assembly will be inserted into the hole to allow for collection of groundwater samples 16/40 filter sand will be poured around the PVC casing to cover at least one foot above the slotted screen Granular bentonite will be poured into the annular space to ground surface to prevent cross contamination A one and one-half foot section of 1 5 inch interior diameter casing will be manually installed around the above ground section of the well assembly with granular bentonite poured around the outside of the well assembly A slip-over PVC cap will be loosely

affixed to the open end of the well assembly to prevent flow down the annulus A screw-on PVC cap will be attached to the 1 5 inch casing for additional protection.

Each geoprobe hole will be checked daily after completion, the water level will be measured according to GW 01 Water Level Measurements in Wells and Piezometers, and, if sufficient water exists for sample collection (estimated as at least one foot of standing water), a sample will be collected using the methods specified in GW 06 Groundwater Sampling. If the geoprobe hole is dry or contains less than one foot of groundwater inside the liner, a notation will be made in the field notebook Those wells that are dry or contain insufficient water for sampling will be revisited after one week has passed, water levels will be measured and the well will be sampled if there is sufficient water Geoprobe holes that are still dry or contain insufficient water for sampling after one week, will be visited weekly or until the field project ends. If sufficient water exists prior to completion of the field project, water level measurements will be taken and then a groundwater sample will be collected All water level determinations will be noted in the project logbooks At the end of the field project, these PVC liners will be left capped in the field in case these can be used during or after installation of the collection system.

4 0 DATA MANAGEMENT

A field logbook will be created and maintained for the project by the project manager or their designee in accordance with ER-ADM-05 14 Use of Field Logbooks and Forms The logbook will be used in conjunction with the appropriate field data forms required by the operating procedures (Table 4) governing the field activities occurring during this project. It is not necessary to duplicate items recorded on field data forms in the field notebook, but if additional clarification of entries on the forms is required, they should be recorded in the field notebook The field notebook should include time and date information concerning the field activities and a sketch map of actual sample locations Information not specifically required by the field data forms should be recorded in the field notebook

Data for this project will be collected, entered, and stored in a secure, controlled, and retrievable environment in accordance with 2-G18-ER-ADM-17 01 Records Capture and Transmittal

Table 4 Applicable Field and Administrative Standard Operating Procedures

Procedure Number	Procedure Title
2 G18 ER ADM 17 01	Records Capture and Transmittal
2 G32 ER ADM 08 02	Evaluation of ERM Data for Usability in Final Reports
2 S47 ER ADM 05 14	Use of Field Logbooks and Forms
5-21000 OPS FO 3	General Equipment Decontamination
5 21000-OPS FO 6	Handling of Personal Protective Equipment
5-21000 OPS FO 7	Handling of Decontaminated Water and Waste Water
5 21000-OPS FO 10	Receiving Labeling and Handling Environmental Material Containers
5-21000 OPS FO 11	Field Communications
5-21000-OPS-FO 13	Containerization Preserving Handling and Shipping of Soil and Water Samples
5 21000-OPS FO 15	Photoionization Detectors and Flame Ionization Detectors
5-21000 OPS FO 16	Field Radiological Measurements
5 21000-ER OPS GT 01	Logging Alluvial and Bedrock Material
5 21000-ER OPS GT 06	Monitoring Wells and Piezometer Installation
5 21000 ER OPS GT 39	Push Subsurface Soil Sample
5-21000 ER OPS GW 01	Water Level Measurements in Wells and Piezometers
5 21000-ER OPS GW 06	Groundwater Sampling

4 1 Project Completion

The results will be compiled into a brief report and map The location and analytical data will be entered into and stored in the Geographical Information System (GIS) files At the end of the project all records and field documentation will be turned over to the records center

The results of this pre-remedial investigation will be utilized in developing a conceptual design and performance standards for the groundwater collection and treatment system at this location

4 2 Quality Assurance

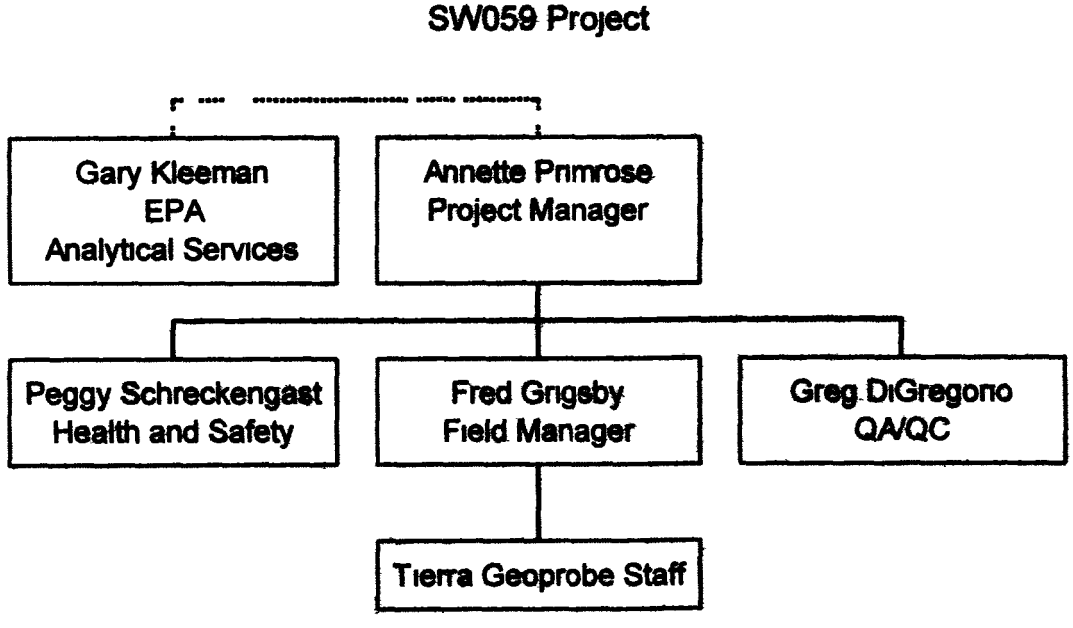
Analytical data collected in support of this investigation will be evaluated using the guidance established by the Rocky Flats Administrative Procedure 2-G32-ER-ADM-08 02 Evaluation of ERM Data for Usability in Final Reports This procedure establishes the guidelines for evaluating analytical data with respect to precision, accuracy representativeness, completeness and comparability (PARCC) parameters For precision, typically the relative percent difference between samples and duplicates are less than or equal to 30% for water less than or equal to 40% for soil Accuracy of the laboratories is the responsibility of EPA Comparability will be evaluated by

comparing the historical data with the data collected using this SAP Completeness will be evaluated by comparing the proposed to the actual field program

5 0 PROJECT ORGANIZATION

The project organization chart is presented in Figure 3 The ER Projects Group is responsible for management and coordination of resources dedicated to the project Other organizations assisting with the implementation of this project are RMRS Groundwater, RMRS Health and Safety, and RMRS Quality Assurance

Figure 3 SW059 Project Organization



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7 0 LIST OF ACRONYMS

DNAPL	Dense Nonaqueous Phase Liquid
DOE	Department of Energy
DQO	Data Quality Objective
EPA	Environmental Protection Agency
ER	Environmental Restoration
GPS	Global Positioning System
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
MCLs	Maximum Concentration Limits
OU	Operable Unit
PAM	Proposed Action Memorandum
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPD	Quality Assurance Program Description
RFCA	Rocky Flats Cleanup Agreement
RFEDS	Rocky Flats Environmental Database System
RFETS	Rocky Flats Environmental Technology Site
RMRS	Rocky Mountain Remediation Services
SAP	Sampling and Analysis Plan
UHSU	Upper Hydrostratigraphic Unit
VOCs	Volatile organic compounds